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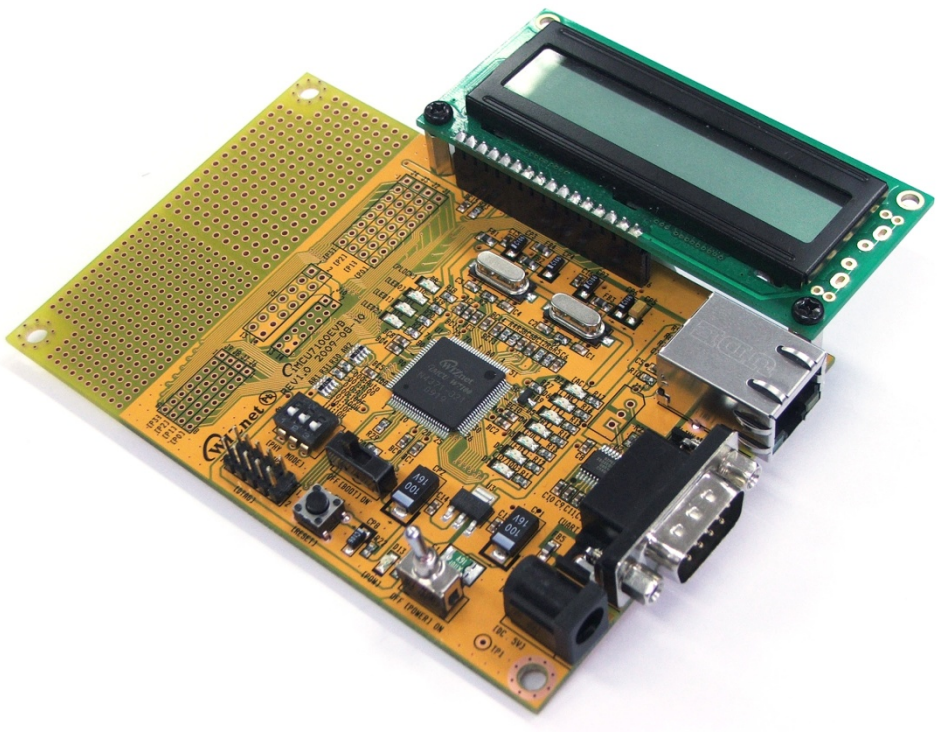
iMCU7100EVB User's Guide

version 0.9βeta



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1 Overview

iMCU7100EVB is an Evaluation Board where the function and performance of W7100 can be tested.

1.1 Introduction

iMCU7100EVB is an Evaluation Board where WIZnet's Internet embedded MCU, W7100, can be used and tested for its functions and performances. iMCU7100EVB can easily build a communication environment by using RS-232 port and LAN port; W7100 can also use supported Character LCD and other added ports to control and test the internal MCU.

1.2 Specification

Part	Description	Remark
MCU	Internet Embedded MCU - W7100	8051 compatible
Memory	64KBytes Data Memory 64KBytes Code Memory 2KBytes Boot code Memory 256Bytes Data Flash	Embedded in W7100
Serial	On board RS-232C 1Port with DB9 Connector	
Ethernet	On board MAC-Jack (Transformer + RJ-45 Connector)	
LCD	16Character * 2Line Character LCD	
LED	User Debugging LED 3Ea Network Status LED 8Ea	
Button	Reset Switch 1Ea	
Debugger	On board Debugger Socket	
Expansion Port	MCU port expantion - 32Pin (8pin * 4) 2.54mm Pitch Pin-Header Hole - 14Pin (7pin * 2) 2.54mm Pitch Pin-Header Hole - 32Pin (8pin * 4) 2.00mm Pitch Pin-Header Hole - 14Pin (7pin * 2) 2.00mm Pitch Pin-Header Hole Dummy Hole - 167Pin 2.54mm Pitch Dummy Hole - 236Pin 2.00mm Pitch Dummy Hole	
Power	DC 5V / 2A Adapter	
PCB	120mm * 80mm Size	

Table 1.1 Lists of Items Contained in the EVB

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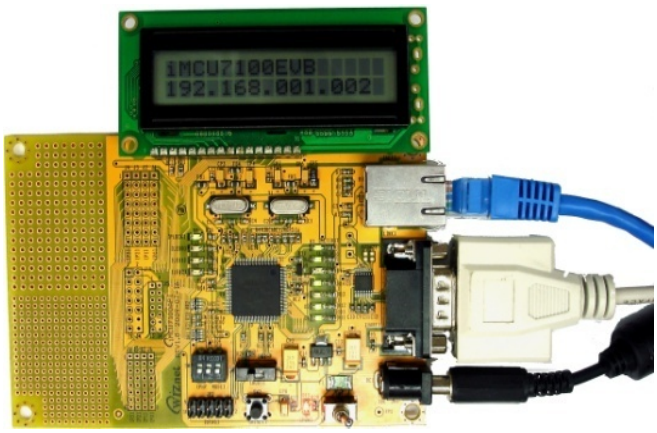
2 Getting Started

2.1 Power On

Connect Character LCD, UTP, and RSR232 with the power cable as shown in the Fig.2.1. below.



<Fig.2.1> iMCU7100EVB Cable and LCD connection

Connect cable to iMCU7100EVB board, confirm power, and check the following.

1. Check whether POWER LED(D13) is ON.
2. Check whether "iMCU7100 EVB" and "192.168.001.002" appears on the Character LCD.

If the above two are checked iMCU7100EVB board will work perfectly.

2.2 Ping Test

Execute the Hyper Terminal of Windows and configure the port as below.

Run the command prompt at TEST PC, and use 'Ping' to check the 'Ping Reply' from W7100.

1. Confirm the network information of Test PC as the following

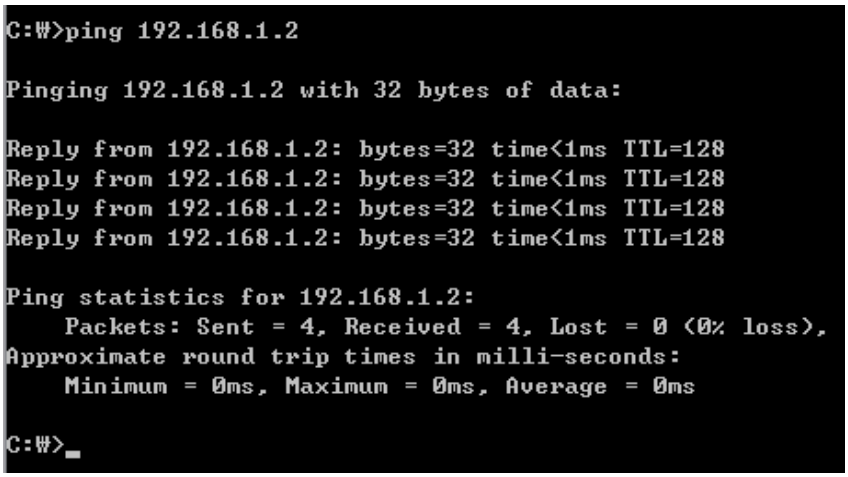
   Source IP Address : 192.168.1.3 (It's up to TEST PC)

   Gatway IP Address : 192.168.1.1

   Subnet Mask : 255.255.255.0

2. Execute ping command as the following

   "C:\> ping 192.168.1.2"



<Fig.2.2> Ping test

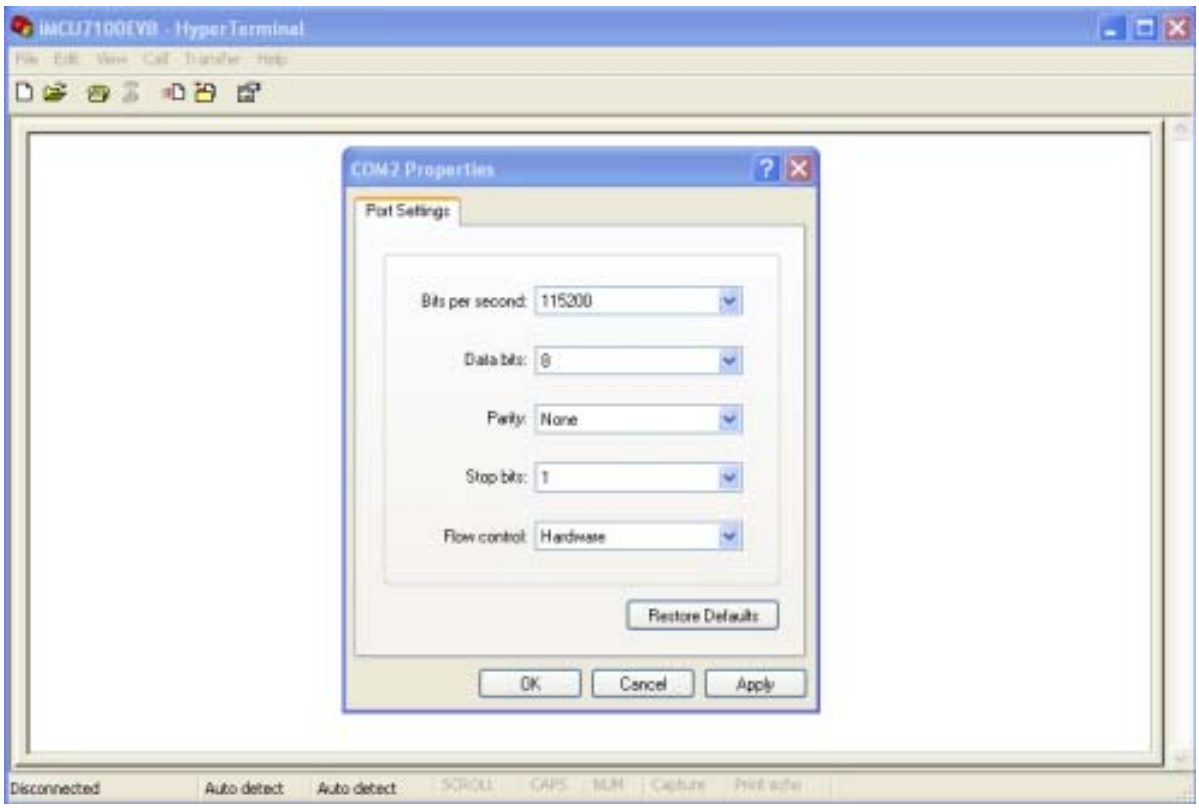
2.3 TCP Server Demonstration.

Lets test a simple TCP server demonstration as followed.

1. Confirm the testing environment.
   - Connect test PC to iMCUW7100EVB by using UTP cable directly.
   - Connect test PC to iMCUW7100EVB by using Serial able directly.
   - Connect 5V power adaptor to test PC
2. Confirm the network information of test PC as fallows
   - Source IP Address : 192.168.1.2
   - Gateway IP Address : 192.168.1.1
   - Subnet Mask : 255.255.255.0
3. After executing serial terminal program (ex: HyperTerminal), set up the properties as followed.

Properties	Setting Value
Bits Per second (Baud Rate)	115200 bps (max230400bps)
Data Bits	8 Bits
Stop Bits	1 Bits
Parity	No
Flow Control	None

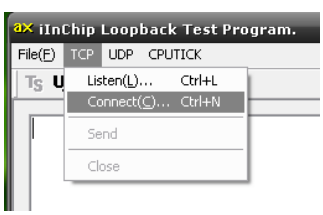
Table2.1 Setting of Terminal program



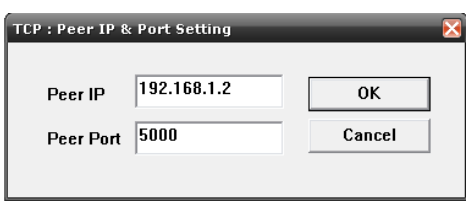
<Fig.2.3> Setting of HyperTerminal program

4. Run AX1 as in the order below. (Please refer to AX1 user's manual for more details)

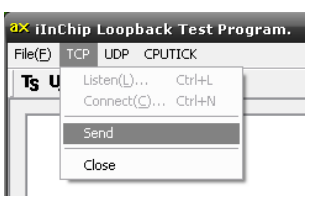
   Execute AX1 as shown in Fig.2.4.



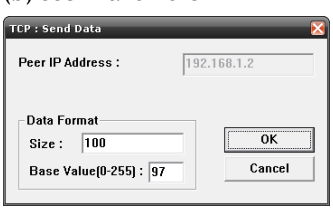
(a) Connecting



(b) set IP and Port



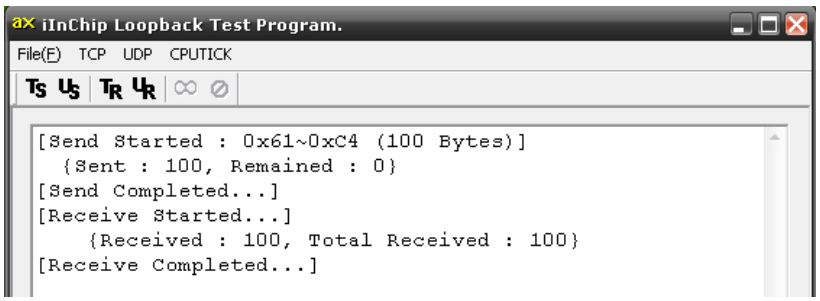
(c) Send data



(d) set data format

<Fig.2.4> Execute AX1

5. **Loopback server Result**

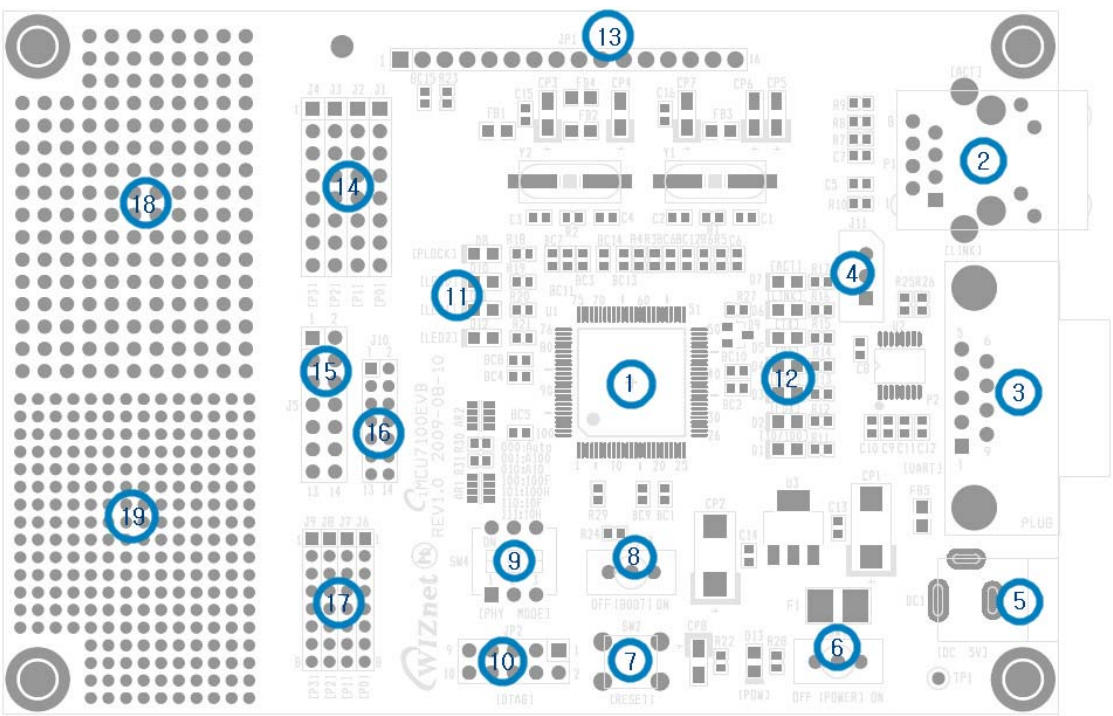


<Fig.2.5> Result of LOOPBACK server Demonstration

2.4 Firmware Upload

When iMCU7100EVB is purchased, the LOOPBACK_TCPS Firmware is included in the CD. If user wants to use a Firmware other than this, (ex: Firmware created by user) the corresponding Firmware can be uploaded by using WizISP or the W7100 Debugger Program. Please refer to WizISP user's guide and W7100 Debugger user's guide for more details on WizISP and W7100 Debugger program.

3 Board Description



<Fig.3.1> Layout of iMCU7100EVB

- The description of each Part is shown in Fig.3.1 is as below.

No	Description	No	Description
1	WIZnet iMCU W7100	2	RJ-45 Jack (integrated transformer)
3	RS-232C DB9 Connector	4	RS-232C 3Pin Header Hole (TTL)
5	DC 5V / 2A Adapter Jack	6	Power Switch
7	Reset Switch	8	Enable Boot Switch
9	PHY mode selection Switch	10	W7100 Debugger Connector
11	User LED * 3Ea	12	Network Status Indicate LED * 8Ea
13	Character LCD Connector	14	MCU Port Expansion Pin Header Hole 32Pin (8pin * 4) 2.54mm Pitch
15	MCU Port Expansion Pin Header Hole 14Pin (7pin * 2) 2.54mm Pitch	16	MCU Port Expansion Pin Header Hole 14Pin (7pin * 2) 2.00mm Pitch
17	MCU Port Expansion Pin Header Hole 32Pin (8pin * 4) 2.00mm Pitch	18	Dummy Pin Header Hole 236Pin 2.00mm Pitch Dummy Hole
19	Dummy Pin Header Hole 167Pin 2.54mm Pitch Dummy Hole		

Table 3.1 Parts Description of iMCU7100EVB

3.1 iMCU W7100 (U1)

The W7100 is the one chip solution which includes an 8-bit internet microcontroller unit (iMCU), embedded 8051 compatible MCU core, and a hardwired TCP/IP core.

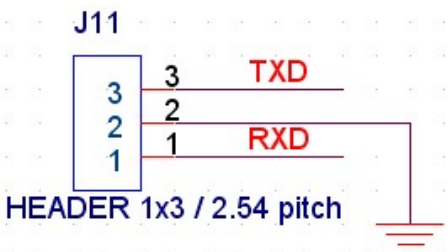
- Please refer to W7100 datasheet for more detail.

3.2 Ethernet Port (P1)

Ethernet Port (P1) is the connector that connects the UTP cable; and is structured of an internal RJ-45 connector with a transformer to connect iMCU7100EVB board to the network.

3.3 RS-232C Serial Port (P2, J11)

RS-232C Serial Port (P2, J11) is a serial interface supported by W7100. RS-232C Serial Port is basically structured to use DSUB 9Pin Male type connector (P2). But RS-232C Serial Port is also structured to independently connect three pin of TX/RX/GND, which are TTL signals, with the Pin header; allowing the user to use user-produced cable. Fig.3.2 shows the structure.



<Fig.3.2> Simple RS-232C Serial Port

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3.4 DC Power Input Connector (DC1)

DC Power Input Connector (DC1) is supported by 5V/2A Adaptor of iMCU7100EVB.

DC Power Input Connector (DC1) is structured for a safe and stable environment by applying Poly_Fuse(F1); to prevent board damage from excessive electric current caused from misusing the adaptor

3.5 Power Switch (SW1)

Power Switch (SW1) is a Toggle switch for turning on/off DC.

3.6 Reset Switch (SW2)

Reset Switch (SW2) is a user manual reset switch to provide users the ability to reset whenever they want (ex: during the system is running).

3.7 Boot Enable Switch (SW3)

Boot Enable Switch (SW3) is used to select the W7100 booting mode and provides the following modes.

SW3	Description
On	Boot Enable. To program by using the WizISP
Off	Boot Disable. To run the application programmed by the WizISP

Table 3.1 Description of Boot Enable switch

3.8 PHY Mode Switch (SW4)

PHY Mode Switch(SW4) is for setting the mode of PHY block inside W7100.

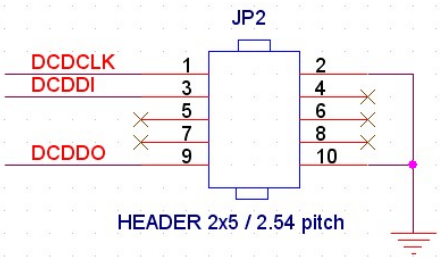
PHY Mode Switch(SW4) provides the following modes.

SW4			Mode	Description
1	2	3		
OFF	OFF	OFF	Auto	Normal Operation Mode Auto-negotiation enable with all capabilities
OFF	OFF	ON	A100	Auto-negotiation with 100 BASE-TX FDX/HDX ability
OFF	ON	OFF	A10	Auto-negotiation with 10 BASE-T FDX/HDX ability
OFF	ON	ON	-	Reserved
ON	OFF	OFF	100F	Manual selection of 100 BASE-TX FDX
ON	OFF	ON	100H	Manual selection of 100 BASE-TX HDX
ON	ON	OFF	10F	Manual selection of 10 BASE-T FDX
ON	ON	ON	10H	Manual selection of 10 BASE-T HDX

Table 3.2 Description of PHY Mode selection switch

3.9 W7100 Debugger Connector (JP2)

W7100 Debugger Connector (JP2) is for monitoring/changing various registers and internal memory inside W7100. User can write applications in the Code memory, therefore allowing efficient debugging of software made by user.



<Fig.3.3> W7100 Debugger Connector

- Please refer to 'W7100 Debugger Guide' for more details on W7100 Debugger.

3.10 User LEDs

There are three User LEDs for the user to control/test the Port and Debugging.

LED Name	W7100 Pin Name	Direction
LED0	P0_3	I
LED1	P0_4	I
LED2	P0_5	I

Table 3.3 Description of User debugging LED

3.11 Network Status Indicate LEDs

Table 2.7 lists the descriptions for Indicate LEDs that tell the network status.

LED Name	W7100 Pin Name	DIR.	Description
10/100	SPDLED	O	Network speed indicate LED Low : 100Mbps , High : 10Mbps
FDX	FDXLED	O	Full / Half duplex indicate LED Low : Full duplex , High : Half duplex
COL	COLLED	O	Collision detect LED Low : Collisions occurred (only in half duplex mode)
RX	RXLED	O	Active Low. Receive activity LED
TX	TXLED	O	Active Low. Transmit activity LED
LINK	LINKLED	O	Active Low. Network link status indicate LED
ACT	ACTLED	O	Active Low. Rx or Tx activity LED
PLOCK	PLOCK	O	Active High. It notifies when internal PLL is locked.

Table 3.4 Description of Status indicate LED

3.12 Character LCD Connector (JP1)

Character LCD Connector (JP1) is for Debugging and showing the system status.

Pin descriptions of Character LCD Interface are as followed.

PIN#	iMCU7100EVB Board PIN NAME / Character LCD PIN NAME	DIR.	Description
1	GND / VSS		Signal Ground
2	5V / VDD	I	LCD Power Supply
3	V0 / V0	I	Voltage for LCD drive
4	P0_0 / RS	I	Data / Instruction register select
5	P0_1 / RW	I	Read / Write
6	P0_2 / E	I	Enable signal,start data read / write
7 ~ 14	P2_0 ~ P2_7 / DB0 ~ DB7	I/O	Data Bus Line
15	Not Connect / LED A	O	LED Anode, power supply+
16	Not Connect / LED K	O	LED Cathode, ground 0V

Table 3.5 Character LCD Interface Pin Description

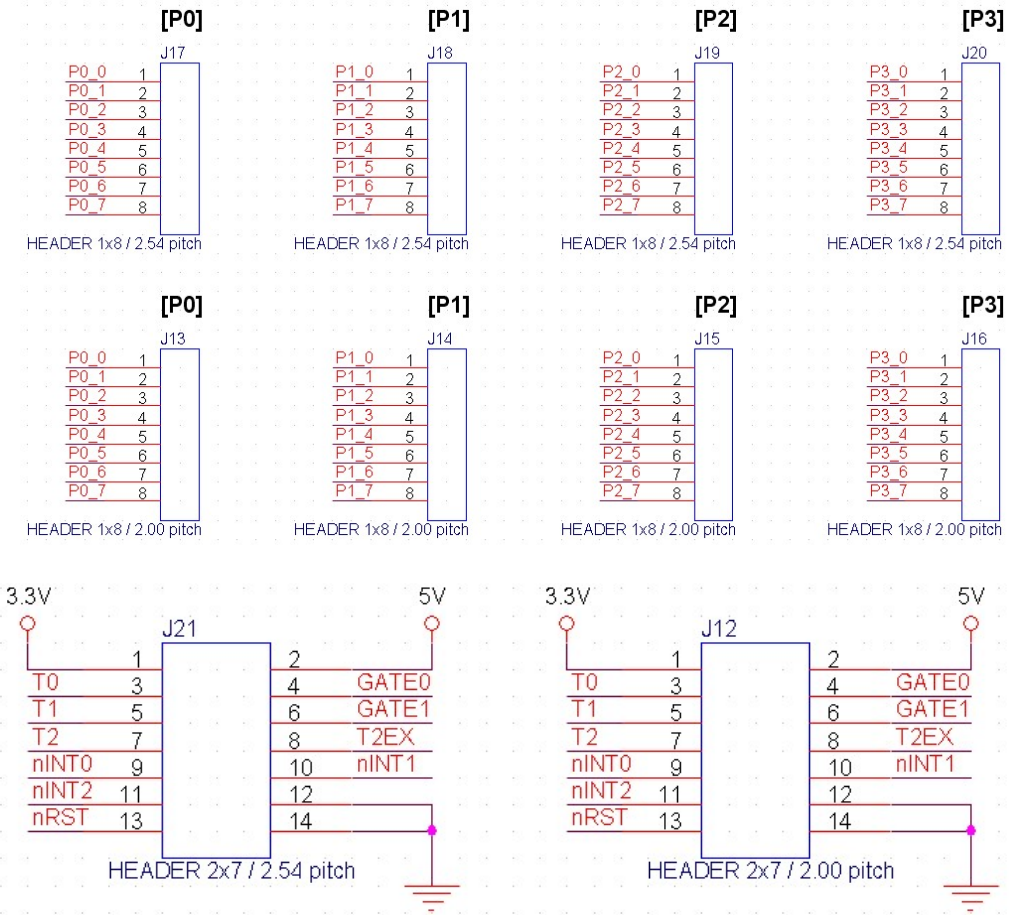
- Please refer to LCD Datasheet (LC1624-R2.pdf) for more details on driving Character LCD.

3.13 MCU Port Expansion Pin header Hole (J1 … J10)

W7100 provides two types of pitch from the total of 32pin (8bit x 4Port) IO pin. User can select according to their needs between 2.54mm Pin pitch and 2.00mm Pin pitch.

iMCU7100EVB board provides four ports of IO to allow users to use with the general pin header.

The description of port expansion is as followed.



<Fig.3.4> Port Expansion Connector

3.14 Dummy Pin Header Hole

Dummy pin header holes are not connected with system circuits. The dummy pin header hole is provided into two types: 2.54mm pitch and 2.00mm pitch.

By using dummy hole, users can test external devices that are in need of additional tests.

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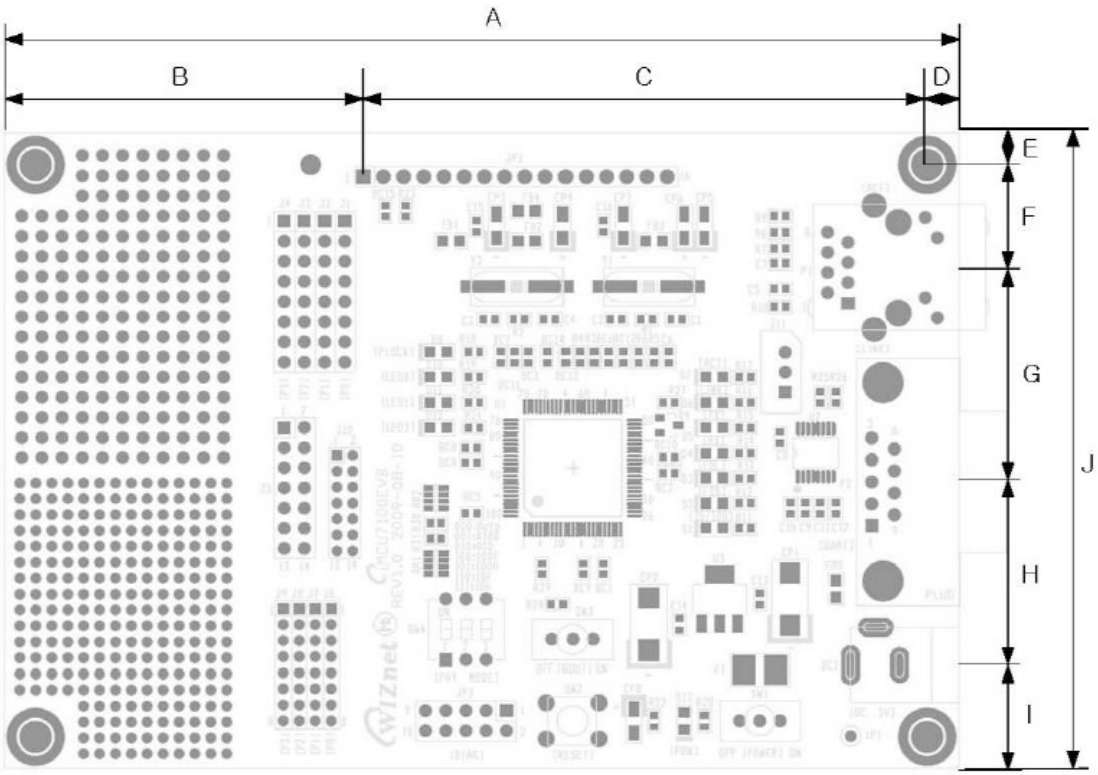
4 Dimension



<Fig.4.1> iMCU7100EVB Dimension

Symbols	Dimensions (mm)	Symbols	Dimensions (mm)
A	120.00	F	12.30
B	45.10	G	27.70
C	70.90	H	23.20
D	4.00	I	12.80
E	4.00	J	80.00

Table 4.1 iMCU7100EVB Board Dimension

Document History Information

Version	Data	Description
Ver.0.9βeta	Sep. 2009	Release with W7100 launching